

REMARKS/ARGUMENTS

Claims 1, 2, 11-24, 29 and 30 are pending. Applicant submits arguments for overcoming the rejections on the prior art of record and respectfully submits that the present application is in condition for allowance.

Claim Rejections – 35 USC §103(a)

- A. *In the FINAL Office Action dated April 25, 2008, independent claims 1 and 2 are rejected under 35 USC §103(a) as being obvious over U.S. Patent No. 5,964,966 issued to Goyal et al. in view of U.S. Patent No. 6,033,536 issued to Ichihara et al.*

The above cited rejection requires one of ordinary skill in the art to combine the teachings of Goyal et al. taken as a whole and the teachings of Ichihara et al. taken as a whole to produce the sputtering target required by independent claims 1 and 2 of the present application. After careful study of these two references, Applicant respectfully requests fair reconsideration of the teachings of these references, in particular, the extreme difference in the complicated technologies of these references and why one of ordinary skill in the art would not be able to arrive at the present invention based on these references when taken as a whole.

More specifically, Applicant respectfully submits that:

(i) an **adequate rationale** sufficient to support the legal conclusion of obviousness (as required according to the U.S. Supreme Court's decision in *KSR Int'l v. Teleflex Inc.*) has not been provided with respect to why it would be obvious for one of ordinary skill in the art to modify the **biaxially textured** metallic substrate of a superconductor taught by Goyal et al. according to a **multi-phase, mosaic** sputtering target for forming soft magnetic thin films of a magnetic recording head of Ichihara et al.;

(ii) the clear requirement of the metallic substrate for a superconductor of Goyal et al. to be “biaxially textured” teaches away from an alloy suitable as a sputtering target that is required to produce few particles during sputtering and deposit thin films of uniform composition; and

(iii) modifying the metallic substrate taught by Goyal et al. such that it is not “biaxially textured” needed for a sputtering target would destroy the intended function of the metallic substrate taught by the Goyal et al. patent.

Accordingly, for these reasons which are discussed in greater detail below, Applicant respectfully requests careful reconsideration of the disclosures of Goyal et al. and Ichihara et al. taken as a whole and removal of the rejection of claims 1 and 2.

(i) No Adequate Rationale for Modifying the Biaxial Texture of Goyal et al.

Following the U.S. Supreme Court’s decision in *KSR Int’l v. Teleflex Inc.*, the U.S. Board of Patent Appeals has consistently held that rejections on obviousness grounds cannot be sustained by mere conclusory statements. Instead, there must be articulate reasoning with rational underpinning to support the legal conclusion of obviousness. The disclosures of prior art references must be taken as a whole, and it is improper to pick and choose various isolated teachings from unrelated references and combine them in hindsight using Applicant’s own disclosure as a blueprint.

Applicant respectfully submits that a proper *prima facie* case of obviousness cannot be made under 35 USC §103(a) following the teachings of Goyal et al. in view of Ichihara et al. because an adequate rationale has not been, and cannot be, articulated for modifying the biaxially textured substrate for a superconductor of Goyal et al. in a manner providing a sputtering target capable of producing few particles during sputtering and of depositing thin films of uniform

composition. Further, one of ordinary skill in the art using common sense at the time of the invention would not have reasonably looked to the teaching of a biaxially textured substrate for a superconductor in connection with producing a sputtering target.

Turning first to the Goyal et al. patent, it discloses growing an oxide high-temperature superconductor epitaxial film on a substrate formed from Ni and a Group VB metal. Goyal et al. clearly disclose that, for the substrate to be useful for its intended purpose, it must have a crystal structure of a so-called “biaxial orientation” comprising a (100) face in relation to the planar direction and a $\langle 001 \rangle$ axis in relation to the rolling direction. (See, for instance, column 1, lines 11-14, with respect to the required biaxial texture.) The reason for the biaxial texture is that high current density characteristics greatly depend on the orientation of the superconductor film. Goyal et al. obtains the biaxial texture with a sharp cube texture by applying “heavy” rolling reduction exceeding 90% to the alloy in which the stacking fault frequency parameter at the time of 60% deformation is less than 0.01. (See, for instance, column 10, lines 40-47.) The described biaxially textured substrate would not be suitable as a sputtering target or the material from which a sputtering target can be formed. Further, Goyal et al. provide no disclosure, teaching, suggestion and/or motivation relating to sputtering targets from which thin films can be deposited without the generation of particles and in a manner in which the deposited thin film is uniform.

Turning next to Ichihara et al., it discloses a target material composed of an M-X alloy and having a multi-phase, mosaic structure including an M-X alloy phase, an M phase, and an X phase. (See, for instance, the Abstract and column 5, lines 50-55.) The disclosed target is specifically adapted to deposit a soft magnetic thin film for a magnetic recording head. (See, for instance, column 1, lines 6-10.)

Applicant respectfully submits that it would not be obvious for one of ordinary skill in the art to modify or combine the teachings taken as a whole of Goyal et al. with the teachings taken as a whole of the Ichihara et al. patent. The substrate of Goyal et al. is not a sputtering target; rather, it is a substrate of a superconductor epitaxial film and is characterized and required to have biaxial orientation thereby rendering it unusable as material for a sputtering target. The M-X alloy of the Ichihara et al. sputtering target requires a multi-phase, mosaic structure including an M-X alloy phase, an M phase, and an X-phase. Accordingly, the orientation and crystal structures of Goyal et al. and Ichihara et al. are extremely different and clearly incompatible.

Applicant also respectfully submits that it is improper and unfair to merely pick and choose the alloy of Goyal et al. without also requiring the disclosed alloy to have the biaxial orientation clearly required by the disclosure of the Goyal et al. patent. Further, Applicant respectfully submits that it is improper and unfair to merely pick and choose a sputtering target of Ichihara et al. without also requiring the disclosed multi-phase, mosaic structure clearly required by the disclosure of the Ichihara et al. patent.

For these reasons, Applicant respectfully submits that the reasoning articulated in the Office Action for combining Goyal et al. with Ichihara et al. is a mere conclusory statement. In the Final Office Action, it is merely stated that “it would be obvious to one of ordinary skill in the art at the time of the invention to utilize the substrate of US ‘966 as a sputtering target *because such alloys are capable of producing magnetic films with large magnetic permeabilities and magnetic flux densities.*” However, as stated above, Goyal et al. require a substrate having a biaxial orientation which is unsuitable as a sputtering target, and Ichihara et al. requires a multiphase mosaic structure and fails to disclose the alloy of the present invention in

which only a small amount of Ta is present (ie., 0.5 to 10at% in claim 1, and 1 to 5at% in claim 2).

Accordingly, Applicant respectfully submits that one of ordinary skill in the art would not find it obvious to combine the teachings of Goyal et al. taken as a whole with the teachings of Ichihara et al. taken as a whole. Applicant respectfully requests reconsideration and removal of the rejection of claims 1 and 2 of the present application.

For purposes of general information, the Ta in the Ni-Ta alloy of the present invention exists as a solid solution in Ni, and the crystal system is configured from the same face-centered cubic lattice as Ni. In addition, X-ray diffraction show that a specific face on the surface of the Ni-Ta alloy sputtering target of the present invention is not oriented; rather, it comprises a structure that is of “random orientation”. This is because, since Ni does not have very high crystal magnetic anisotropy, the difference in the passage of the magnetic flux is minimal regardless of which face it is facing. Also, the rolling process of the present invention is performed only for the purpose of destroying cast structure and refining the structure. Unlike Goyal et al., the rolling of the present invention is not intended to control crystalline orientation. The rolling process of the present invention only aims to destroy cast structure so as to reduce the generation of particles during sputtering; therefore, the draft (rolling) reduction is less than 90% unlike that required by the Goyal et al. patent.

(ii) Goyal et al. Teaches Away from the Present Invention

As discussed above, the superconductor substrate of Goyal et al. must have a biaxial orientation and such biaxial orientation is not desirable as a material of a sputtering target.

Accordingly, Goyal et al.'s requirement that the substrate have biaxial orientation clearly teaches away from the random orientation required of a sputtering target which by its definition must be able to deposit a uniform thin film without the generation of particles during a sputtering operation.

"Teaching away" is the antithesis of the art suggesting that the person of ordinary skill in the art go in the claimed direction. Essentially, "teaching away" is a per se demonstration of lack of obviousness. In re Fine, 873 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

For at least this additional reason, Applicant respectfully requests reconsideration and removal of the obviousness rejection of claims 1 and 2 of the present application.

(iii) Modifying Goyal et al. would Destroy its Intent, Purpose or Function

When a §103 rejection is based upon a modification of a reference that destroys the intent, purpose or function of the invention disclosed in the reference, such a proposed modification is not proper and a *prima facie* case of obviousness cannot be properly made. In re Gordon, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

The intent, purpose and function of Goyal et al. are to provide a substrate for a superconductor. The substrate is required to have a crystal structure of a so-called "biaxial orientation" comprising a (100) face in relation to the planar direction and a <001> axis in relation to the rolling direction. The reason for the biaxial texture is that high current density characteristics greatly depend on the orientation of the superconductor film. Goyal et al. obtains the biaxial texture with a sharp cube texture obtained by applying "heavy" rolling reduction exceeding 90% to the alloy in which the stacking fault frequency parameter at the time of 60% deformation is less than 0.01.

To use the alloy of Goyal et al. as a sputtering target, the substrate would require random orientation, not biaxial orientation. However, eliminating the biaxial orientation of the substrate would destroy the intent, purpose and function of the invention disclosed in the Goyal et al. patent.

Further, Ichihara et al. require a multiphase mosaic structure (see, for instance, FIG. 5 of Ichihara et al.) requiring significant content of all alloy elements. In contrast, the present invention requires only a minimal amount of Ta. Thus, modifying Ichihara et al. to such an alloy composition would destroy the intent, purpose and function of the invention disclosed in the Ichihara et al. patent.

For at least these additional reasons, Applicant respectfully requests reconsideration and removal of the obviousness rejection of claims 1 and 2 of the present application.

Accordingly, Applicant respectfully submits that claims 1 and 2 of the present application are non-obvious and patentable over Goyal et al. in view of the Ichihara et al. patent.

B. In the FINAL Office Action, claims 11-14 and 18-21 are rejected under 35 USC §103(a) as being obvious over U.S. Patent No. 5,964,966 issued to Goyal et al. in view of U.S. Patent No. 6,033,536 issued to Ichihara et al. in further view of U.S. Patent No. 6,485,542 B2 issued to Shindo et al.

Applicant respectfully submits that dependent claims 11-14 and 18-21 are patentable over the above referenced rejection for the same reasons discussed above with respect to independent claims 1 and 2 being non-obvious and patentable over Goyal et al. in view of the Ichihara et al. patent.

Accordingly, Applicant respectfully requests reconsideration and removal of this rejection.

- C. *In the FINAL Office Action, claims 15-17 are rejected under 35 USC §103(a) as being obvious over U.S. Patent No. 5,964,966 issued to Goyal et al. in view of U.S. Patent No. 6,033,536 issued to Ichihara et al. in further view of the IEE publication of Herser.*

Applicant respectfully submits that dependent claims 15-17 are patentable over the above referenced rejection for the same reasons discussed above with respect to independent claims 1 and 2 being non-obvious and patentable over Goyal et al. in view of the Ichihara et al. patent.

Accordingly, Applicant respectfully requests reconsideration and removal of this rejection.

- D. *In the FINAL Office Action, claims 22-24 are rejected under 35 USC §103(a) as being obvious over U.S. Patent No. 5,964,966 issued to Goyal et al. in view of U.S. Patent No. 6,033,536 issued to Ichihara et al. in further view of U.S. Patent No. 6,485,542 B2 issued to Shindo et al. and further in view of the IEE publication of Herser.*

Applicant respectfully submits that dependent claims 22-24 are patentable over the above referenced rejection for the same reasons discussed above with respect to independent claims 1 and 2 being non-obvious and patentable over Goyal et al. in view of the Ichihara et al. patent.

Accordingly, Applicant respectfully requests reconsideration and removal of this rejection.

E. In the FINAL Office Action, claim 29 is rejected under 35 USC §103(a) as being obvious over U.S. Patent No. 5,964,966 issued to Goyal et al. in view of U.S. Patent No. 6,033,536 issued to Ichihara et al. in further view of U.S. Patent No. 6,485,542 B2 issued to Shindo et al. and U.S. Patent No. 5,667,665 issued to Shindo et al. and further in view of the IEE publication of Herser.

Applicant respectfully submits that dependent claim 29 is patentable over the above referenced rejection for the same reasons discussed above with respect to independent claims 1 and 2 being non-obvious and patentable over Goyal et al. in view of the Ichihara et al. patent.

Accordingly, Applicant respectfully requests reconsideration and removal of this rejection.

F. In the FINAL Office Action, claim 30 is rejected under 35 USC §103(a) as being obvious over U.S. Patent No. 5,964,966 issued to Goyal et al. in view of U.S. Patent No. 6,033,536 issued to Ichihara et al. in further view of U.S. Patent No. 5,667,665 issued to Shindo et al.

Applicant respectfully submits that dependent claim 30 is patentable over the above referenced rejection for the same reasons discussed above with respect to independent claims 1 and 2 being non-obvious and patentable over Goyal et al. in view of the Ichihara et al. patent.

Accordingly, Applicant respectfully requests reconsideration and removal of this rejection.

Conclusion

In view of the above remarks, Applicant respectfully submits that the rejections have been overcome and that the present application is in condition for allowance. Thus, a favorable action on the merits is therefore requested.

Please charge any deficiency or credit any overpayment for entering this Amendment to
our deposit account no. 08-3040.

Respectfully submitted,
Howson & Howson LLP
Attorneys for Applicants

By /William Bak/
William Bak
Reg. No. 37,277
501 Office Center Drive
Suite 210
Fort Washington, PA 19034
(215) 540-9216